Bioenergy Supply Analyses
GIS/Regionalization Scoping Workshop
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Forest and agricultural sources of biomass

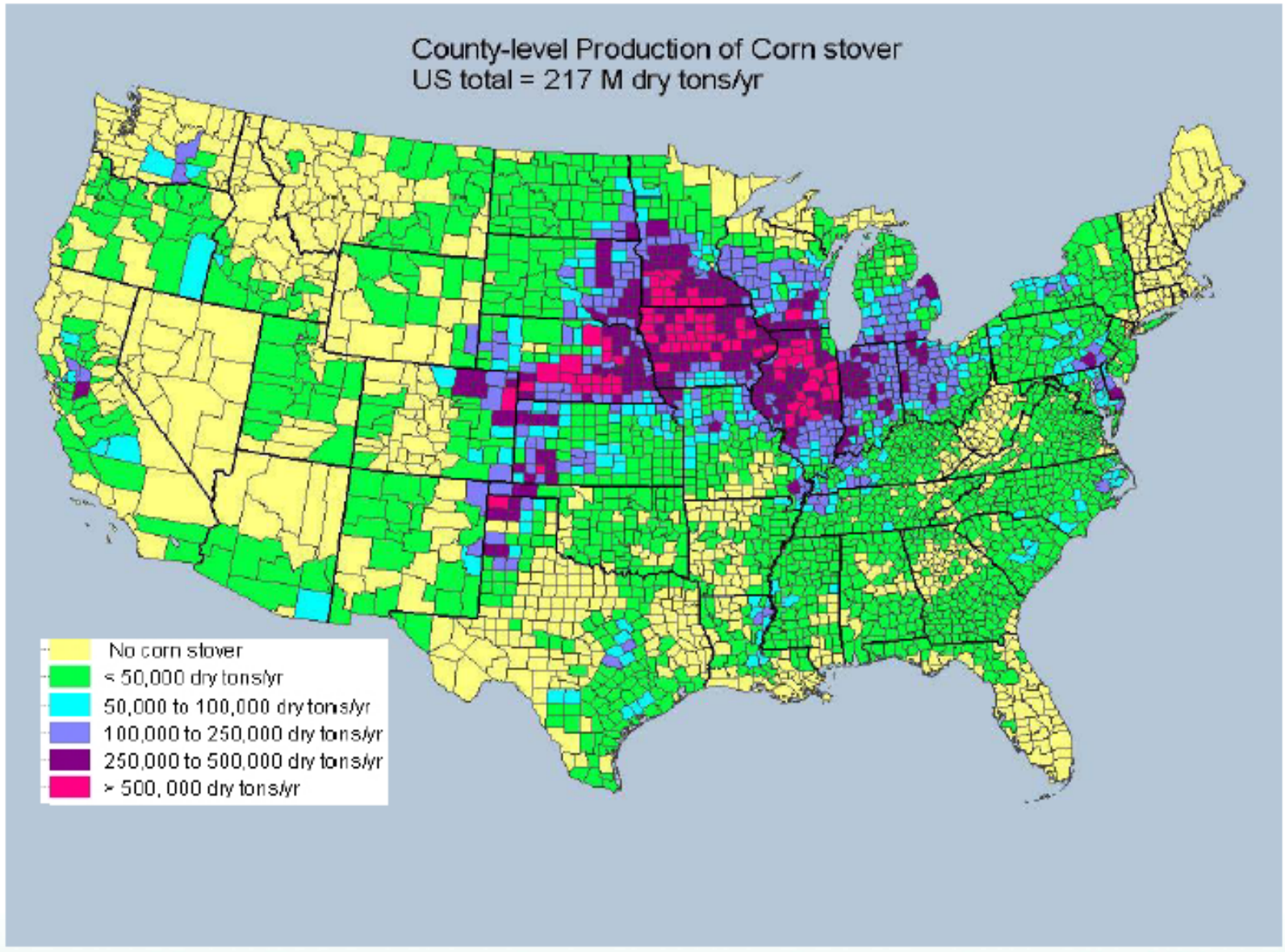
Forest resources	Agricultural resources
• Output - Logging residues and other removals • Inventory – Rough & rotten wood, excess saplings/polewood, fuel hazard material	• Crop residues – corn stover & wheat straw • Herbaceous energy crops – switchgrass • Woody crops – poplars, willow
• Primary mill residue (bark and coarse & fine residue) • Secondary mill residues • Industrial processing wastes (pulping liquors)	• Animal manures • Food/feed processing wastes
• Urban wood wastes (e.g., construction and demolition debris, tree trimmings, …)	• Post-consumer wastes • Landfill gases

Supply schedules estimated for five major biomass resources

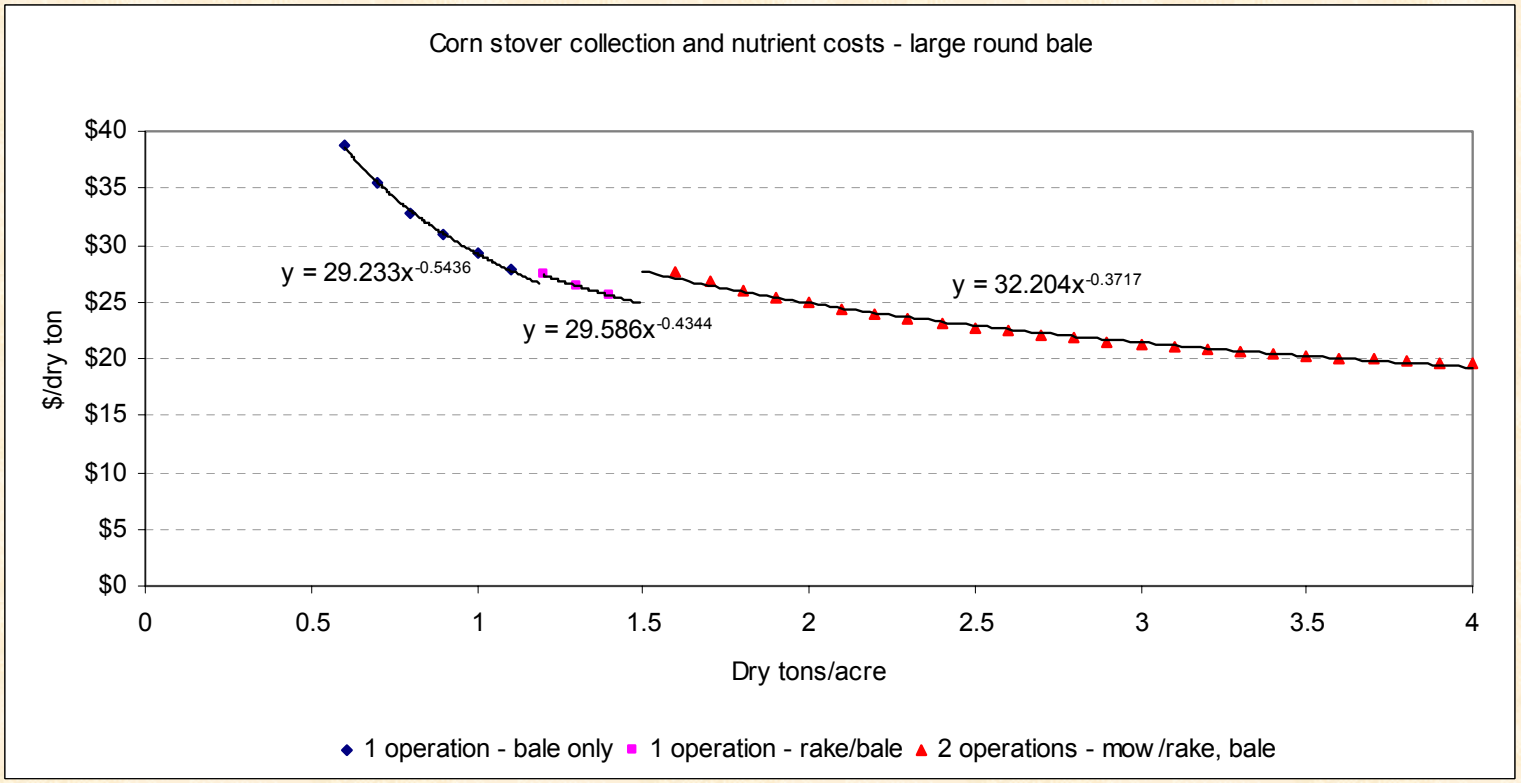
- Supply schedules available at a county-level
  - Agricultural residues
  - Forest residues
  - Primary mill residues
  - Urban wood wastes
  - Energy crops (switchgrass, poplars, willow)

Agricultural residues

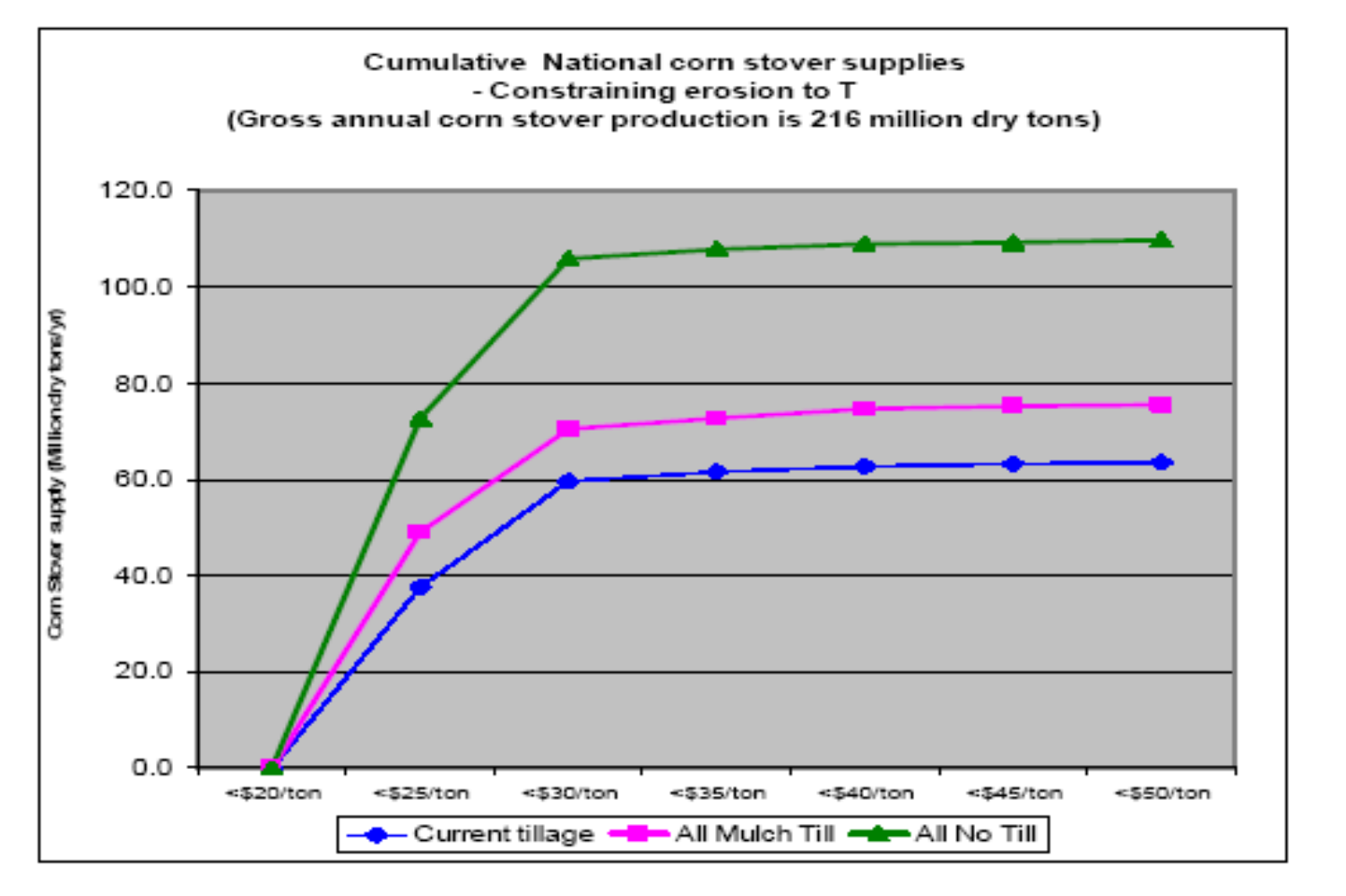
- Relegated to major grains – corn stover and wheat straw
- New county-level analysis completed, includes environmental constraints (erosion and moisture)

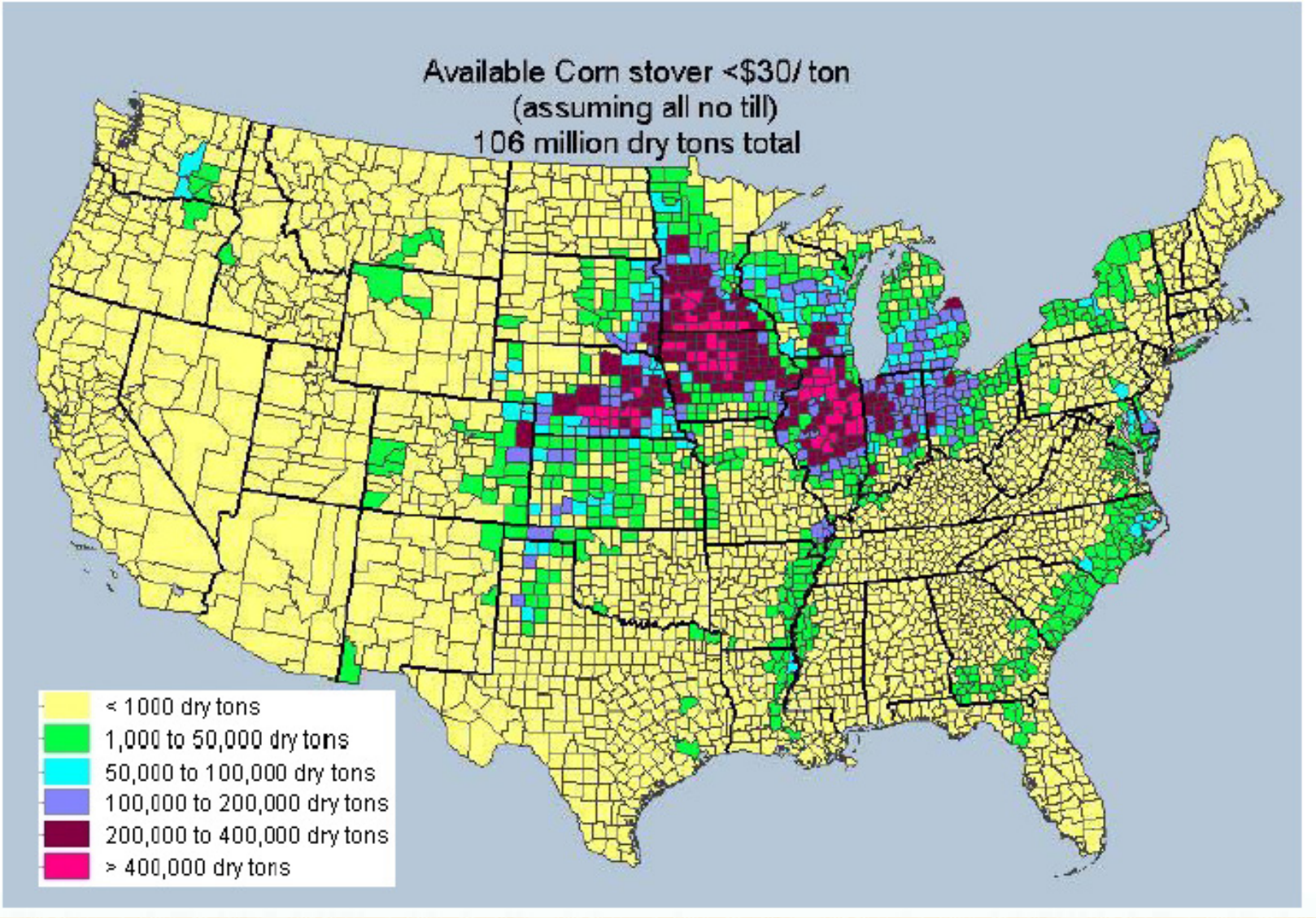

County-level Production of Corn stover
US total = 217 M dry tons/yr
No corn stover
≤ 50,000 dry tons/yr
50,000 to 100,000 dry tons/yr
100,000 to 250,000 dry tons/yr
250,000 to 500,000 dry tons/yr
> 500, 000 dry tons/yr

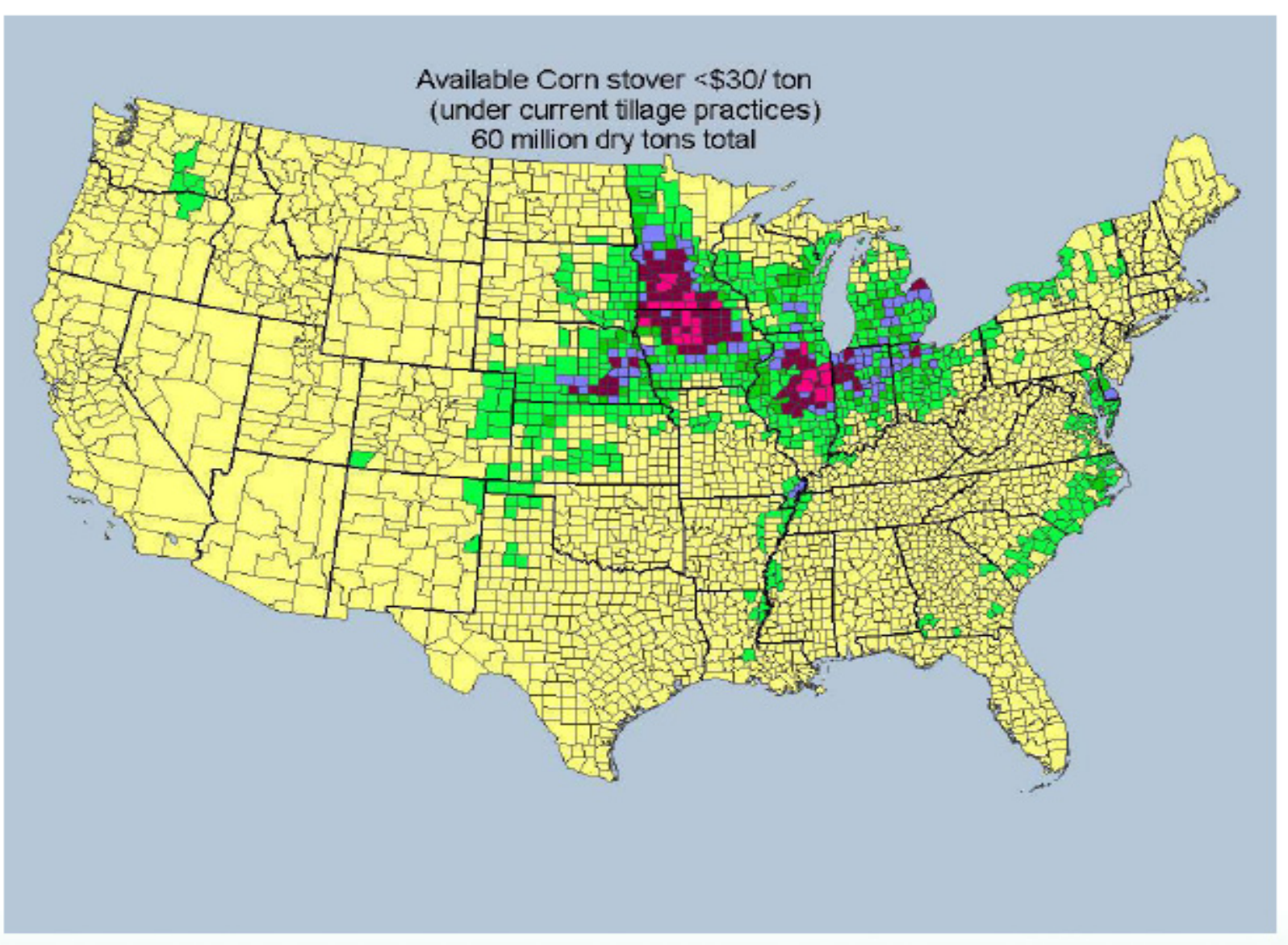
Corn stover collection options – equations used to estimate costs



Total estimated corn stover supply




Available Corn stover <$30/ ton
(assuming all no till)
106 million dry tons total
< 1000 dry tons
1,000 to 50,000 dry tons
50,000 to 100,000 dry tons
100,000 to 200,000 dry tons
200,000 to 400,000 dry tons
> 400,000 dry tons


Available Corn stover <$30/ ton
(under current tillage practices)
60 million dry tons total

Forest residues

- County-level supply schedules available for logging residues and salvable dead and rough/rotten wood
- New county-level estimates under development for logging residues and inventory residues (e.g., overstocked stands, fuel reduction prescriptions), available FY05

GIS can be used to develop location-specific forest residue supply curves

- GIS analysis data and models:
  - Forest inventory data (size/distribution, site productivity, management prescriptions)
  - Sampling issues with biomass or small-sized trees (remote sensing?)
  - Forest management prescriptions
  - Merchantability fractions (energy and small-diameter material product markets)
  - Land ownership patterns (private vs. public)
  - Environmental and topography restrictions (operability and steep slopes)
  - Site access, road networks, and distances from collection sites to demand (road types, conditions, and use limitations)
  - Harvest and transport costs (dependent on tree size characteristics, removals per acre, scale of operation, harvest system, block or tract sizes, distances within stand to landing area, landing area to processing areas, road types and grade, etc.)
  - Regulatory issues

Other supply schedules

- Urban wood wastes
  - New quantity data available
  - Updated county-level supply schedules under development, available FY05
- Energy crops (switchgrass, hybrid poplar, and willow) and agricultural residues
  - Revised economic simulation model of the US agriculture sector under development for modeling agricultural residues and energy crops, available FY05-06
- Other biomass supplies – mill residues, processing wastes, regionally significant biomass resources ?

Summary

- County-level supply curves are or will be available for major biomass resources
- Quality of estimates varies among biomass resources
- Probably adequate for EERE modeling
- Sub-county difficult without additional data
- GIS approaches available – data intensive, data availability, analysis and study costs